

CLAIMS

1. A multi-speed transmission comprising:
 - an input shaft;
 - an output shaft;
 - a planetary gear arrangement having first, second and third
 - 5 planetary gear sets, each planetary gear set having first, second and third members;
 - said input shaft being continuously interconnected with said first member of said first planetary gear set, and said output shaft being continuously interconnected with said first member of said third planetary
 - 10 gear set;
 - said first member of said second planetary gear set being integrally connected with said first member of said third planetary gear set; and said third member of said first planetary gear set being continuously connected with a transmission housing;
 - 15 an interconnecting member continuously interconnecting said second member of said second planetary gear set with said second member of said third planetary gear set;
 - a first torque-transmitting mechanism selectively interconnecting said second member of said first planetary gear set with said third member of
 - 20 said third planetary gear set;
 - a second torque-transmitting mechanism selectively interconnecting said first member of said first planetary gear set with said third member of said third planetary gear set;
 - a third torque-transmitting mechanism selectively interconnecting
 - 25 said third member of said second planetary gear set with said transmission housing;

a fourth torque-transmitting mechanism selectively interconnecting said second member of said first planetary gear set with said third member of said second planetary gear set;

30 a fifth torque-transmitting mechanism selectively interconnecting said first member of said first planetary gear set with said second member of said third planetary gear set;

 a sixth torque-transmitting mechanism selectively interconnecting said second member of said second planetary gear set with said transmission
35 housing; and

 said first, second, third, fourth, fifth and sixth torque-transmitting mechanisms being engaged in combinations of two to establish seven forward speed ratios and a reverse speed ratio between said input shaft and said output shaft.

2. The transmission of claim 1, wherein said first member of said second planetary gear set and said first member of said third planetary gear set comprise a single elongated ring gear.

3. The transmission of claim 1, wherein said first and second planetary gear sets are simple planetary gear sets, and said third planetary gear set is a compound planetary gear set.

4. The transmission of claim 1, wherein each of said first members is a ring gear, each of said second members is a planet carrier assembly member, and each of said third members is a sun gear.

5. The transmission of claim 1, wherein said first, second, fourth and fifth torque-transmitting mechanisms comprise rotating clutches, and said third and sixth torque-transmitting mechanisms comprise brakes.

6. The transmission of claim 1, wherein said first member of said second planetary gear set and said first member of said third planetary gear set comprise ring gears which are integrally connected by a sleeve to which both ring gears are splined.

7. The transmission of claim 6, further comprising a spacer and spring member positioned between said first member of said second planetary gear set and said first member of said third planetary gear set.

8. The transmission of claim 1, wherein said second torque-transmitting mechanism is positioned between said first and second planetary gear sets.

9. The transmission of claim 1, wherein said second torque-transmitting mechanism is positioned at a location which is not between said first, second and third planetary gear sets.

10. The transmission of claim 4, wherein said second torque-transmitting mechanism is engaged by a piston which is supported on and rotating with a housing member which is integrally connected with the ring gear of said first planetary gear set.

11. The transmission of claim 4, wherein said second torque-transmitting mechanism is engaged by a piston which is supported on and rotating with a housing member which is integrally connected with the planet carrier assembly member of said first planetary gear set.

12. A multi-speed transmission comprising:

an input shaft;

an output shaft;

a planetary gear arrangement having first, second and third

5 planetary gear sets, each planetary gear set having a ring gear, a planet carrier assembly member, and a sun gear;

said input shaft being continuously interconnected with said ring gear of said first planetary gear set, and said output shaft being continuously interconnected with said ring gear of said third planetary gear set;

10 said ring gear of said second planetary gear set being integrally connected with said ring gear of said third planetary gear set; and said sun gear of said first planetary gear set being continuously connected with a transmission housing;

an interconnecting member continuously interconnecting said
15 planet carrier assembly member of said second planetary gear set with said planet carrier assembly member of said third planetary gear set;

a first torque-transmitting mechanism selectively interconnecting said planet carrier assembly member of said first planetary gear set with said sun gear of said third planetary gear set;

20 a second torque-transmitting mechanism selectively interconnecting said ring gear of said first planetary gear set with said sun gear of said third planetary gear set;

a third torque-transmitting mechanism selectively interconnecting said sun gear of said second planetary gear set with said transmission
25 housing;

a fourth torque-transmitting mechanism selectively interconnecting said planet carrier assembly member of said first planetary gear set with said sun gear of said second planetary gear set;

a fifth torque-transmitting mechanism selectively interconnecting
30 said ring gear of said first planetary gear set with said planet carrier
assembly member of said third planetary gear set;

a sixth torque-transmitting mechanism selectively interconnecting
said planet carrier assembly member of said second planetary gear set with
said transmission housing; and

35 said first, second, third, fourth, fifth and sixth torque-transmitting
mechanisms being engaged in combinations of two to establish seven
forward speed ratios and a reverse speed ratio between said input shaft and
said output shaft.

13. The transmission of claim 12, wherein said ring gear of said
second planetary gear set and said ring gear of said third planetary gear set
comprise a single elongated ring gear.

14. The transmission of claim 12, wherein said first and second
planetary gear sets are simple planetary gear sets, and said third planetary
gear set is a compound planetary gear set.

15. The transmission of claim 12, wherein said first, second,
fourth and fifth torque-transmitting mechanisms comprise rotating clutches,
and said third and sixth torque-transmitting mechanisms comprise brakes.

16. The transmission of claim 12, wherein said ring gear of said
second planetary gear set and said ring gear of said third planetary gear set
are integrally connected by a sleeve to which both ring gears are splined.

17. The transmission of claim 16, further comprising a spacer
and spring member positioned between said ring gear of said second
planetary gear set and said ring gear of said third planetary gear set.

18. The transmission of claim 12, wherein said second torque-transmitting mechanism is positioned between said first and second planetary gear sets.

19. The transmission of claim 12, wherein said planet carrier assembly member of said second planetary gear set is continuously connected with said planet carrier assembly member of said third planetary gear set, and said second torque-transmitting mechanism is positioned at a location
5 which is not between said first, second and third planetary gear sets.

20. A multi-speed transmission comprising:
an input shaft;
an output shaft;
a planetary gear arrangement having first, second and third
5 planetary gear sets, each planetary gear set having a ring gear, a planet carrier assembly member, and a sun gear;
wherein said second planetary gear set is a simple planetary gear set, and said third planetary gear set is a compound planetary gear set;
said input shaft being continuously interconnected with said ring
10 gear of said first planetary gear set, and said output shaft being continuously interconnected with said ring gear of said third planetary gear set;
said ring gear of said second planetary gear set being integrally connected with said ring gear of said third planetary gear set; and said sun gear of said first planetary gear set being continuously connected with a
15 transmission housing;
wherein said ring gear of said second planetary gear set and said ring gear of said third planetary gear set are integrally connected by a sleeve to which both ring gears are splined, and a spacer and spring member are

positioned between said ring gear of said second planetary gear set and said
20 ring gear of said third planetary gear set;

an interconnecting member continuously interconnecting said
planet carrier assembly member of said second planetary gear set with said
planet carrier assembly member of said third planetary gear set;

a first torque-transmitting mechanism selectively interconnecting
25 said planet carrier assembly member of said first planetary gear set with said
sun gear of said third planetary gear set;

a second torque-transmitting mechanism selectively
interconnecting said ring gear of said first planetary gear set with said sun
gear of said third planetary gear set, wherein said second torque-transmitting
30 mechanism is positioned between said first and second planetary gear sets;

a third torque-transmitting mechanism selectively interconnecting
said sun gear of said second planetary gear set with said transmission
housing;

a fourth torque-transmitting mechanism selectively
35 interconnecting said planet carrier assembly member of said first planetary
gear set with said sun gear of said second planetary gear set;

a fifth torque-transmitting mechanism selectively interconnecting
said ring gear of said first planetary gear set with said planet carrier
assembly member of said third planetary gear set;

40 a sixth torque-transmitting mechanism selectively interconnecting
said planet carrier assembly member of said second planetary gear set with
said transmission housing; and

said first, second, third, fourth, fifth and sixth torque-transmitting
mechanisms being engaged in combinations of two to establish seven
45 forward speed ratios and a reverse speed ratio between said input shaft and
said output shaft.

21. The transmission housing of claim 20, wherein said first, second, fourth and fifth torque-transmitting mechanisms comprise rotating clutches, and said third and sixth torque-transmitting mechanisms comprise brakes.

22. The transmission of claim 20, wherein said planet carrier assembly member of said second planetary gear set is continuously connected with said planet carrier assembly member of said third planetary gear set.